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Costa, Marco; Dinsbach, A.A.; Manstead, A.S.R.; Ricci-Bitti, Pio-Enrico

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SOCIAL PRESENCE, EMBARRASSMENT, AND NONVERBAL BEHAVIOR

Marco Costa, Wies Dinsbach, Antony S. R. Manstead, and Pio Enrico Ricci Bitti

ABSTRACT: Nonverbal behaviors in response to viewing slides depicting nude males, nude females, erotic couples and neutral pictures, either alone or in the presence of two unfamiliar individuals, were studied in 22 female and 16 male university students. Participants were unaware of being videorecorded. Results revealed discrepancies between self-reported embarrassment and nonverbal behaviors supposedly expressive of embarrassment. Although self-reported embarrassment was higher when certain types of slides were viewed in the presence of others than when they were viewed alone, we observed significantly fewer lip movements, gaze shifts, face touches, downward gazes, and downward head movements in the presence of unfamiliar individuals than in the alone condition. We also compared behaviors during slide exposure and during the inter-slide intervals. For 9 out of 11 coded behaviors, frequencies were significantly higher during inter-slide intervals than during slide presentation. We argue that this is probably due to the fact that visual attention to the slides inhibited nonverbal behaviors. The results cast doubt on the possibility of inferring the internal state of an emotion such as embarrassment by analyzing nonverbal behaviors without taking account of the social setting in which such observations are made.

KEY WORDS: social inhibition; embarrassment; nonverbal behavior; emotion; attention.

The aim of the present study was to assess the impact of the presence of unfamiliar others on the experience and display of embarrassment. Embarrassment being a typically social emotion, it seems reasonable to expect its behavioral manifestations to be more likely to be elicited in social settings than under alone conditions. Furthermore, felt embarrassment should be greater in the presence of strangers. Previous research has established

Marco Costa, Department of Psychology, University of Bologna, Italy. Wies Dinsbach and Antony S. R. Manstead, Department of Psychology, University of Amsterdam, The Netherlands. Pio Ricci Bitti, Department of Psychology, University of Bologna, Italy.

Address correspondence to Marco Costa, Department of Psychology, University of Bologna, Italy; e-mail: costa@psibo.unibo.it.

that embarrassment in both children and adults tends to be less intense among family and friends than among strangers and new acquaintances (Lewis, Stanger, Sullivan, & Barone, 1991; MacDonald & Davies, 1983).

With regard to the expression of embarrassment, laboratory studies and naturalistic observations have established that embarrassment is associated with gaze aversion, shifting eye position, speech disturbances, face touching, a "nervous, silly smile," and rigid posture (Asendorpf, 1990; Edelmann & Hampson, 1979, 1981; Eibl-Eibesfeldt, 1989; Goffman, 1967; Heckhausen, 1984; Lewis, Alessandri, & Sullivan, 1992; Modigliani, 1971; Stipek, Recchia, & McClintic, 1992). Keltner (1995) showed that the embarrassment display typically unfolds in the following sequence: gaze aversion; a smile control (a lower facial action that inhibits the smile); a non-Duchenne smile that only involves the *zygomatic major* muscle pulling the corners of the lips upward; a second smile control; downward head movements; and face-touching. There is evidence that this pattern of display and its temporal unfolding is characteristic of embarrassment (Keltner & Buswell, 1997).

According to Keltner and Buswell (1997) five distinct accounts for embarrassment can be identified. According to the loss of self-esteem account, individuals feel embarrassed when they believe that they have failed to act in accordance with personal standards (Edelmann, 1987; Modigliani, 1968, 1971). According to the social evaluation account, individuals experience embarrassment when they perceive their actions as threatening their desired social identity (Miller, 1996; Miller & Leary, 1992). From this perspective embarrassment is the product of a monitoring of the self that motivates individuals to conform, to avoid social exclusion, and to restore relations that have been disrupted by social transgressions (Miller & Leary, 1992; Tangney et al., 1996). Developmental studies indicate that concern for other's evaluation is closely related to the onset of the experience of embarrassment and that embarrassment increases with age-related developments in the capacity to assume others' perspectives (Bennett, 1989).

According to the awkward interaction account, embarrassment occurs when individuals fail to behave in accordance with socially defined scripts and roles (Goffman, 1967; Parrott & Smith, 1991). Embarrassment is equated with confused behavior and the absence of poise and grace: It looks and feels like a chaotic fluster, and it reflects an inability to act in ways that are consistent with one's social image (Goffman, 1967). The fourth account focuses on the remedial nature of the verbal and nonverbal responses of embarrassment. When individuals commit transgressions, they engage in corrective facework. These remedial actions demonstrate the individual's commitment to social norms and prompt forgiveness in others (Semin &

Manstead, 1982). Closely related to this theory is the appeasement account of embarrassment (Keltner, 1995). Based on studies of reconciliation in non-human species and of apologies in humans, this account proposes that embarrassment unfolds in a sequence that reflects the experience of threatened social relations (normally as a consequence of rule violation) and a display of submissive and affiliative behaviors that reduce aggression and elicit social approach in others. As in the social evaluation account, social threat is critical in the generation of embarrassment; as in the remedial account, embarrassment restores social relations.

All these accounts posit an important role of social evaluation and social rules as determinants of embarrassment. It therefore seems reasonable to suggest that the nonverbal display of embarrassment should be greater in social settings than when the same antecedents of embarrassment are experienced alone. The primary aim of the present study was to test this hypothesis. The same embarrassing and arousing situation, namely the viewing of nude and erotic pictures (along with neutral control slides), was experienced either alone or in the company of two unfamiliar individuals, one female and one male. Participants were unaware of being videorecorded, and their nonverbal behaviors were subsequently coded and scored for frequency of occurrence.

In western society it is more appropriate to watch erotic material alone or in the presence of intimate friends than in the company of unfamiliar persons, especially in a formal setting. The task used in the present research therefore entails social rule violation and transgression, thereby meeting the social evaluation, the awkward interaction, and the remedial account requirements for embarrassment. The capacity of this slide presentation procedure to induce embarrassment was examined by collecting self-report data. Ratings of embarrassment, shame, anxiety, disgust, joy, interest and surprise were made after the slides had been presented. By assessing emotions other than embarrassment we tried to rule out the possibility that any observed differences resulted from emotional states that were not strictly social. What we expected was that the presence of unfamiliar individuals would enhance self-reports of embarrassment, shame, and anxiety, which are highly correlated, but not self-reports of the other emotions.

Our general hypothesis was that nonverbal behavior indicative of embarrassment would mirror the subjective experience of embarrassment. More specifically, it was anticipated that self-reported embarrassment and nonverbal expressions of embarrassment would be greater when participants were in the company of others than in the alone condition. We also anticipated that self-reported embarrassment and nonverbal expressions of

embarrassment would be greater during the nude and erotic slides than during the neutral slides, given the sexual content of the former. Finally, we predicted that self-reported embarrassment and nonverbal expressions of embarrassment would be greater when the embarrassing stimuli were present (slide on) than when there was a pause (inter-slide interval).

Method

Participants

Twenty-two female (mean age = 24.45, s.d. = 4.81) and 16 male (mean age = 24.31, s.d. = 3.59) university students participated in this study. All were enrolled in an introductory psychology course and received course credit for participation. The videorecording of one male was excluded from analysis because the participant exhibited signs of severe anxiety during the slide show, and the behavioral data of one female could not be included in the analysis due to technical problems with the recording.

Apparatus

Participants were seated on an armless rotating chair in a dimly lit room facing a table on which there was a 50-cm × 50-cm back-lit projection screen. A carousel-type slide projector with a zoom lens was focused on the screen. In the alone condition a single chair was provided; in the social condition two additional chairs were placed either side and a little behind the participant's chair (with their positions marked by chalk on the floor). The location of the additional chairs was such that the participants could not directly observe the way in which persons seated in these chairs reacted to the slides. A videocamera was mounted on a tripod in a corner opposite to the slide projector. The camera lens was fitted with a 45-degree mirror angle-scope, such that the camera stood at 90° to the recording field and participants were therefore not aware of being recorded. The recording included the participant's face, hands, trunk, and part of their legs.

The slide series contained 12 slides: Three were neutral slides depicting household objects, and 9 were emotionally loaded, including 3 in each of the 3 following categories. *Erotic couples* depicting nude or seminude men and women engaged in sexual activities. *Nude females* and *nude males* depicting frontal views of attractive persons aged 20–30 years. The slides were presented in two random orders. The orders were determined by randomly selected Latin squares, the only restriction being that the first

slide was neutral. The first order was NFMMNFCMCNCF (N being a neutral slide; F, a female nude; M, a male nude and C, an erotic couple). The second order was NMCMNCFFCFNM.

Procedure

Each participant was first informed that nude and erotic pictures would be presented, and his or her consent was obtained. Participants were told that the study was concerned with emotional reactions to a series of nude and erotic slides when viewed alone or in the presence of two experimenters. They were also told that there was no task that they needed to perform during slide presentation and that after the presentation they would be asked to complete a questionnaire. Precisely the same procedure of slide presentation followed by a questionnaire was followed twice, once in the alone condition and once in the together condition. During the together condition the first and second authors (male and female, respectively) were in the room and viewed the slide presentation with the participant. Any attempt by the participant to communicate with the experimenters during the slide presentation was met with a neutral, non-reinforcing response. Each slide was presented for 8 s and the length of the inter-slide interval was randomized within the range 6–10 s such that the mean interval was the same as the presentation time. Randomizing the length of the inter-slide interval was motivated by the need to avoid habituation. The order of the alone and together conditions was counter-balanced across participants. Initial data analyses including order revealed no significant effects associated with this factor and it will therefore not be discussed any further.

Self-Report

A questionnaire was administered after the alone and together conditions. Participants were asked to report how they felt while viewing slides belonging to each of the four stimulus categories (neutral, male nude, female nude, erotic couple). This they did by rating each of the following emotions: embarrassment, shame, anxiety, disgust, joy, interest, and surprise. Responses were made by circling a number on a 7-point scale with anchors labeled “not at all” and “very much.” The questionnaire was arranged so that order of slide category and emotion type was randomized within each of the two experimental conditions. The participants were also asked to rate embarrassment for each slide category (a) when viewing the slides and (b) during the inter-slide interval. On completion of the second

of the two conditions, participants were informed about the presence of the camera, permission to use their videotaped images was requested, and they were instructed to not discuss the study with other potential participants. All participants gave permission to use the recordings.

Coding of Nonverbal Behavior

Following Keltner and Buswell (1997), we coded the following 11 behaviors: lip movement (including lips together, lip corner depress, lip bite, lip pucker, lip stretch, lip funnel, lip press, lip suck, and lip wipe); silly smile (a nervous non-Duchenne smile that only involves an upward lip movement); gaze shift (a lateral eye movement not accompanied by head movement); gaze down (an eye movement directed downwards); head down; head away (lateral movement); head inclination; face touching (hand movements toward the face); hand movement (not directed toward the face); shifting posture (complex movements involving trunk, hands, or legs resulting in a changed position on the chair); and chair rotation (subjects were seated on a rotating chair).

Coding was performed for each slide, distinguishing between behaviors that occurred during slide presentation and behaviors that occurred during the inter-slide interval. If a behavior extended in duration from the slide presentation to the inter-slide interval, or vice versa, the behavior was scored twice (once for each period) to allow the comparison between the two conditions. This happened quite frequently in the case of relatively long-lasting behaviors such as lip movements and chair rotations and could have (a) inflated the absolute number of these behaviors and (b) violated the assumption of independence of observations. However, our objective was not to assess the absolute frequencies of nonverbal behaviors in response to embarrassing slides but rather to make comparisons between the alone and together conditions and the slide versus inter-slide interval periods. The fact that behaviors were double-counted when they spanned the border between the two time periods results in a conservative test of the differences between these periods.

Reliability of Measurement

We followed the same method as the one reported by Keltner (1995). One person coded all participants' behavior. A second person who was unaware of the participants' reports of emotion and of the aims of the research coded 10 participants who were randomly selected from the total sample. Intercoder reliability was evaluated by calculating a ratio in which

the number of behaviors on which the two coders agreed was multiplied by 2 and then divided by the total amount of coded behaviors scored by the two persons. The mean ratio was .839.

Data Analysis

Self-report data were submitted to a MANOVA with the scores for the various emotions entered as separate dependent variables and using the following variables as factors: (a) Gender of participant; (b) Social Presence (alone vs. together); (c) Slide Content (neutral, male nude, female nude, erotic couple). Gender was further evaluated by means of two ANOVAs, considering the negative emotions (embarrassment, shame, anxiety, and disgust) and positive emotions (joy, interest, and surprise) separately, using Gender, Slide Content, and Social Presence as factors. Subjective ratings of embarrassment during slide presentation or inter-slide interval were analyzed by an ANOVA including the following factors: (a) Gender; (b) Social Presence; (c) Slide Status (slide on vs. interval), and (d) Slide Content.

The codings of nonverbal behavior were first submitted to a log-linear analysis (Streiner & Lin, 1998) in order to establish the model that fitted the multi-way frequency tables best, and then single comparisons were performed by chi-square test. Where not indicated below, the degrees of freedom were equal to 1.

Results

Self-Report Data

The Social Presence multivariate main effect was significant (Rao's $R[7, 30] = 3.18$, $p < .01$). In univariate terms it was significant in the case of embarrassment, $F(1, 36) = 13.27$, $p < .001$; shame, $F(1, 36) = 7.12$, $p < .01$; and anxiety, $F(1, 36) = 7.04$, $p < .01$. In each case, scores were higher in the together condition than in the alone condition. There was no Social Presence effect in the case of disgust, joy, interest, or surprise. The Slide Content multivariate main effect was significant (Rao's $R[21, 16] = 9.05$, $p < .0001$). The univariate effect was significant for all emotions except surprise. Reports of embarrassment, shame, and anxiety were highest for male nudes; next came female nudes, followed by erotic couples, and then neutral slides, the same trend being apparent for all three emotions.

The multivariate interaction between Gender and Slide Content was significant (Rao's $R[21, 16] = 3.51$, $p < .006$). The same interaction was

significant in relation to positive emotions ($F[3, 105] = 4.26$, $p < .007$) and negative emotions ($F[3, 108] = 22.27$, $p < .001$). Planned comparisons revealed a higher overall rating of embarrassment ($F[1, 35] = 4.55$, $p < .04$) and shame by females ($F[1, 35] = 5.21$, $p < .02$) and of joy by males ($F[1, 36] = 3.99$, $p < .05$). Post-hoc tests revealed that females made higher ratings of embarrassment ($p < .04$), shame ($p < .03$), and disgust ($p < .001$) in response to female nudes, and higher ratings of shame ($p < .02$) and disgust ($p < .03$) in response to erotic couples. Female participants also made higher ratings of joy ($p < .05$) and interest ($p < .003$) in response to male nudes, whereas male participants responded to female nudes with higher ratings of joy ($p < .001$) and interest ($p < .001$).

The Slide Status main effect was significant, $F(1, 35) = 12.9$, $p < .001$. Embarrassment was rated as stronger during slide presentation than during the inter-slide interval. The interaction between Slide Status and Slide Content was also significant, $F(3, 105) = 4.96$, $p < .01$. Post-hoc analyses revealed that embarrassment was higher during presentation of female nudes, male nudes, and erotic couples than during the inter-slide interval, but this was not true for neutral slides.

Nonverbal Behavior

A loglinear analysis was performed to assess the interrelations among the variables Social Presence (alone vs. together), Behavior Type (the 11 categories of behavior), Slide Status (on vs. off), and Slide Content (neutral, male nudes, female nudes and erotic couple). A model with 2 two-way interactions fitted the data, likelihood ratio $\chi^2 = 127.02$, df = 156, $p = .956$. The non-significance of this model reflects a failure to reject the null hypothesis, and the model is therefore considered to be a good description of the data. Each of the two interactions was tested and found to be necessary to maintain good model fit. The first interaction was between Social Presence and Behavior Type ($\chi^2 = 45.4$, df = 11, $p < .001$). The second interaction was between Slide Status and Behavior Type ($\chi^2 = 223.4$, df = 11, $p < .001$).

A total of 1481 behaviors were coded. Fifty-nine per cent occurred in the alone condition and 41% in the together condition. Frequencies of occurrence of each behavior in the two conditions are shown in Figure 1. There was a significantly higher frequency in the alone condition than in the together condition for the following six behaviors: lip movements ($\chi^2 = 7.52$, $p < .006$), gaze shift ($\chi^2 = 15.03$, $p < .001$), face touching ($\chi^2 = 31.24$, $p < 001$), gaze down ($\chi^2 = 14.33$, $p < .001$), and head down ($\chi^2 = 11.63$, $p < .001$).

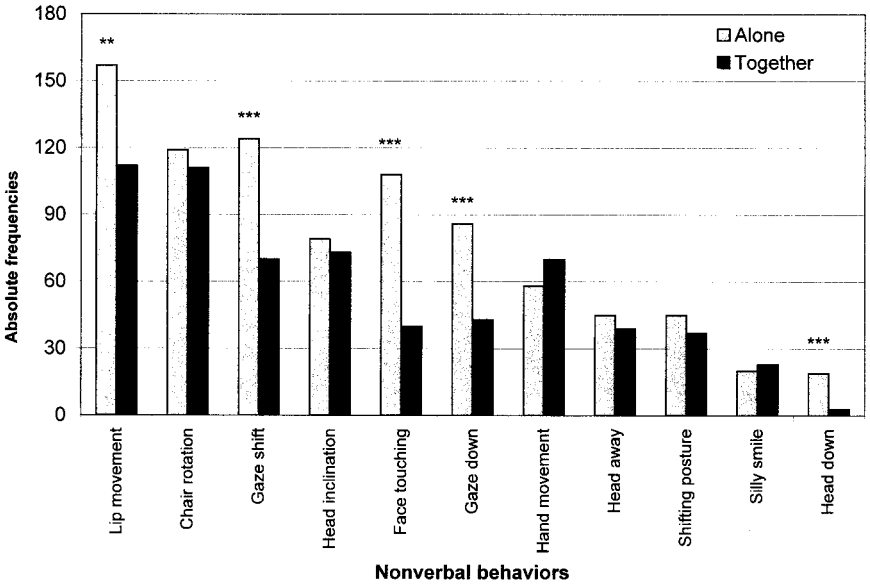

Figure 1. Absolute frequencies for each nonverbal behavior in decreasing order in the alone and in the together (with two unfamiliar individuals) condition (** = $p < .01$, *** = $p < .001$).

The frequencies of each behavior in the slide presentation and inter-slide intervals are shown in Figure 2. Seventy-two per cent of all behaviors occurred during the inter-slide interval and the remaining 28% occurred during slide presentation. The difference between presentation and inter-slide interval was significant for 9 of the 11 behaviors: lip movement ($\chi^2 = 80.33$, $p < .001$), chair rotation ($\chi^2 = 12.67$, $p < .001$), gaze shift ($\chi^2 = 159.67$, $p < .001$), gaze down ($\chi^2 = 117.27$, $p < .001$), hand movement ($\chi^2 = 22.78$, $p < .001$), head away ($\chi^2 = 27.42$, $p < .001$), shifting posture ($\chi^2 = 12.48$, $p < .001$), silly smile ($\chi^2 = 10.25$, $p < .002$), and head down ($\chi^2 = 11.63$, $p < .001$). For all these behaviors, except silly smile, the frequency was higher during inter-slide interval than during slide presentation. The interaction between Slide content and Behavior type was not significant.

Gender

Gender was not entered into the log-linear analysis reported above because of the unequal number of men and women. We therefore an-

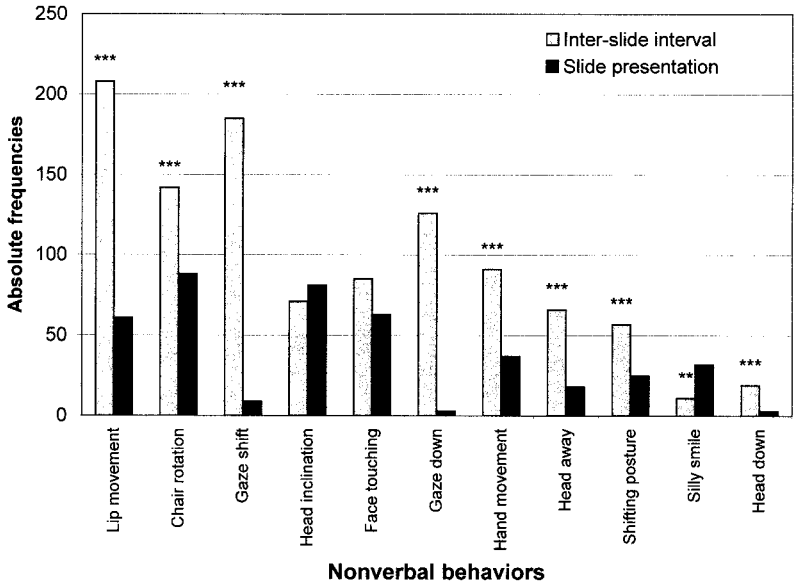

Figure 2. Absolute frequencies for each nonverbal behavior occurred during inter-slide interval and during slide presentation (** = $p < .01$, *** = $p < .001$).

alyzed the influence of gender in a separate analysis, after proportionally reducing female nonverbal behaviors to $n = 15$, i.e., the number of male participants available for nonverbal behavior analysis. The results revealed a significant effect of gender: After weighting the female behaviors, 494 (38%) of the coded embarrassment behaviors were by females, whereas 789 (62%) were by males ($\chi^2 = 67.8$, $p < .001$). The higher frequency of embarrassment behaviors in the alone condition was significant for both males ($\chi^2 = 8.73$, $p < .003$) and females ($\chi^2 = 25.3$ $p < .001$), as was the higher occurrence of such behaviors during inter-slide interval condition than during slide presentation ($\chi^2 = 143.9$, $p < .001$ for male participants, and $\chi^2 = 96.2$, $p < .001$ for female participants).

Correlations

Correlations were computed between self-reports of embarrassment and the total occurrence of nonverbal behaviors. The resulting correlation was $r = -.17$ ($p < .04$) in the together condition, and $r = -.28$ ($p < .001$) in the alone condition. The equivalent correlations were $r =$

$-.27$ ($p < .002$) for the inter-slide interval, and $r = -.16$ ($p < .05$) for slide presentation.

Discussion

Showing slides with nude and erotic content was effective in inducing embarrassment, shame, and anxiety. As expected, the presence of others induced greater embarrassment, shame, and anxiety among participants, but this was only the case when viewing nude slides, and did not apply to the erotic couples or the neutral slides. The social context of the viewing situation did not affect self-reported disgust, joy, interest, or surprise.

The nonverbal behavior data also suggested that participants were embarrassed and aroused by the slide-viewing procedure. The most commonly observed behaviors (lip movements, chair rotations, gaze shifts, head inclinations, face touching, gazes down, hand movements, head away, shifting postures, silly smiles, and head down) are those found by Keltner and Buswell (1997) to be prototypical embarrassment displays (with the exception of chair rotation, which was not considered by those authors). However, there were some interesting discrepancies between the self-report data and the behavioral data, as also reflected by the negative correlations between the two measures. First, participants reported feeling different degrees of embarrassment as a function of slide content, but there were no differences in frequencies of nonverbal behavior as a function of this variable. Second, contrary to our hypothesis and inconsistent with the self-report data, 5 of the 11 nonverbal behaviors were *less* frequent in the together condition than in the alone condition. Third, although females reacted to the nude and erotic pictures with more self-reported shame and less self-reported happiness, male participants exhibited more embarrassing behaviors than did females. Our rationale at the outset of the study was that because embarrassment is a prototypically social emotion, its nonverbal manifestations should be more frequent when there is an audience. The findings reported above suggest that such reasoning is too simple. Although the presence of an unfamiliar audience increased the subjective experience of embarrassment, shame, and anxiety in response to viewing nude slides, there was less behavioral manifestation of these emotions when an audience was present.

The phenomenon of social inhibition of expressive behavior has been documented in several previous investigations (e.g., Friedman & Miller-Herringer, 1991; Kleck et al., 1976; Kraut, 1982). Yarczower and Daruns (1982) showed that the presence of a potential communication partner pro-

duced suppression of facial expression in children. This social inhibition was accompanied by increased uncertainty on the part of raters in assigning emotion labels to the children's expressions. Other studies have shown that accuracy of imitation and intensity of facial expressions is reduced when someone was present as compared to alone conditions (Yarczower, Kilbride, & Hill, 1979; Kilbride & Yarczower, 1980). Furthermore, Guerin (1989) found that student participants decreased the number of body movements, hand movements, and paralinguistic vocalizations they exhibited while in the presence of another (passive) person, in both laboratory and field settings. He also found that this effect disappeared when the other person present could not observe the participant.

However, there is also compelling evidence that expression of emotion is facilitated by social presence (e.g., Chovil, 1991; Fridlund, 1991; Hess, Banse & Kappas, 1995; Jakobs, Manstead & Fischer, 1999a, 1999b). Most studies showing social facilitation have involved pleasant emotional stimuli and the other persons explicitly or implicitly present typically had some sort of personal relationship with the participants. In contrast, studies in which social inhibition was observed usually involved negative emotion, and the other person concerned typically had a different role or status than did the participant, did not have a personal relationship with the participant, and was not exposed to the emotional stimulus (e.g., Buck, Losow, Murphy, & Costanzo, 1992). Expressive behavior in minimally social situations is more likely to reflect the particular motivational and emotional state elicited by the emotional stimulus than are expressive behaviors made when others are present (Buck, 1988; Ekman, 1984). Solitary displays bear a simpler relationship to an emotional elicitor for two reasons. First, when one is alone there is relatively little need to use display rules to present an appropriate image to others in relation to the elicitor. Second, other persons function as eliciting stimuli themselves, which makes it more difficult to interpret the display as resulting simply from the primary elicitor (Buck, 1990).

Social inhibition and facilitation in response to embarrassment may be related to the phenomenon of "under-compensation" and "over-compensation" that have been observed in studies of deception (e.g., Riggio & Friedman, 1983; DePaulo & Rosenthal, 1979). A person can dissimulate an internal state by suppressing or exaggerating the relevant behavioral components. For example, if someone pretends to like someone whom he or she in fact dislikes, and expresses more positive liking for this person than when describing a person he or she genuinely likes, he or she is overcompensating; by contrast, if he or she expresses less liking for the disliked

other than when describing a genuinely liked other, he or she is under-compensating. Both social presence and individual differences might determine which of these two strategies is adopted in deception situations (DePaulo & Friedman, 1998). The inhibition of embarrassment behavior observed in the present study may reflect an attempt to appear to be less embarrassed than was actually the case, and the associated use of an under-compensation strategy.

The largest effect found in the present study was the difference in frequency of behavior between the period of slide presentation and the inter-slide interval. Only one-third of all the coded behaviors occurred when the embarrassing stimuli were being presented, the rest occurring when the participant was waiting for the next slide to appear. The only exception to this general trend was the silly smile, which was more frequent during slide presentation than during the inter-slide interval. The greater occurrence of the remaining behaviors during the inter-slide interval might be due to the fact that behavior expressions during slide presentation were inhibited for social reasons, and/or because of the interest and arousal evoked by the slide stimuli. The latter reactions may have captured attentional resources and at the same time interrupted ongoing behavior until the stimulus disappeared.

The results relating to gender provide further evidence of a dissociation between self-reported embarrassment and embarrassment behaviors. Whereas females reported more embarrassment and shame in response to erotic pictures, overall they exhibited fewer embarrassment behaviors than male participants did. Previous researchers have found simple dissociations whereby the more intense and frequent embarrassment reported by females was not mirrored in behavioral measures (Keltner, 1995; Miller & Leary, 1992). One possible reason why this dissociation was stronger in the present study concerns the nature of the stimuli used to induce embarrassment. Many studies have shown that nude and erotic stimuli have a greater impact on males than on females. Quinsey, Ketsetzis, Earls, and Karamanoukian (1996), for example, showed that males spend longer exploring nude and erotic pictures than do females. Gender differences are more pronounced when the stimulus material is “hard erotic” rather than “soft erotic,” and when the participants are college age rather than older persons (Murnen & Stockton, 1997). Thus it could be that the embarrassment experienced by females reflected a negative evaluation of the stimuli (at least under these experimental viewing conditions), and this manifested itself in higher self-reports of embarrassment. Males did not rate themselves as feeling especially embarrassed because in general they evaluated the stimuli

more positively than did females. The "embarrassment" manifested behaviorally by males may simply have reflected the stronger affective impact of the stimuli.

One of the limitations of the present study is that self-report ratings were only obtained at the end of each condition (i.e., alone or together), rather than after each stimulus. This might have constrained the accuracy with which participants were able to report their emotional experiences in relation to each slide category. Furthermore, for ethical reasons subjects were informed at the outset of the experiment that nude and erotic pictures would be presented under alone and together conditions. This may have served to heighten the salience of the inappropriateness of viewing this sort of material in public, in which case it is possible that participants' ratings may have reflected this perceived inappropriateness by making it appear that they were more embarrassed than actually was the case. Although this is an issue than can only be properly resolved by conducting further research, we frankly doubt whether it can fully account for one of the central findings of the present study, namely the discrepancy between self-reported embarrassment and observed behaviors supposedly indicative of embarrassment.

The discrepancies between the subjective and behavioral responses observed in the present study illustrate the difficulties entailed in inferring an emotional state on the basis of analysis of nonverbal behavior. In the context of a relatively complex social emotion such as embarrassment it is unlikely for there to be a straightforward relationship between the frequency of nonverbal behaviors and the intensity of the subjective emotion. The social circumstances in which the emotion is elicited may play a key role in shaping nonverbal behavior, either inhibiting or facilitating its occurrence, depending among other things on the relationship between the individual and those who are onlookers. A second type of complicating factor is the possibility of different rise and decay times for subjective states and nonverbal behaviors; if both the onset and the offset of the latter are slower than is the case for the subjective emotional state, the relation between subjective state and nonverbal behavior will be attenuated. A final point that has thus far received limited attention is the possible role played by attentional processes in modulating nonverbal behavior. In social emotions, in particular, there is likely to be a close relation between the attention devoted to monitoring the self (e.g., its inadequacy in the case of embarrassment) and the intensity of experienced emotion. If emotion is elicited by highly attention-demanding stimuli, and if we assume that attention is a limited resource, then it is quite possible to have seemingly paradoxical cases in which nonverbal behaviors do not accompany the

presentation of the eliciting stimuli but rather are manifested later, when attentional resources can be allocated to monitoring the self.

References

Asendorpf, J. (1990). The expression of shyness and embarrassment. In W. R. Crozier (Ed.), *Shyness and embarrassment: Perspectives from social psychology* (pp. 87–118). Cambridge, England: Cambridge University Press.

Bennett, M. (1989). Children's self-attribution of embarrassment. *British Journal of Developmental Psychology, 7,* 207–217.

Buck, R. (1988). *Human motivation and emotion* (2nd ed.). New York: Guilford.

Buck, R. (1990). Using FACS versus communication scores to measure the spontaneous facial expression of emotion in brain-damaged patients. *Cortex, 26,* 275–280.

Buck, R., Losow, J. I., Murphy, M. M., & Costanzo, P. (1992). Social facilitation and inhibition of emotional expression and communication. *Journal of Personality and Social Psychology, 63,* 962–968.

Chovil, N. (1991). Social determinants of facial displays. *Journal of Nonverbal Behavior, 15,* 141–154.

DePaulo, B. M., & Friedman, H. S. (1998). Nonverbal communication. In D. T. Gilbert & S. T. Fiske (Eds.), *The handbook of social psychology,* Vol. 2 (pp. 3–40). New York: McGraw-Hill.

DePaulo, B. M., & Rosenthal, R. (1979). Telling lies. *Journal of Personality and Social Psychology, 37,* 1713–1722.

Edelmann, R. J. (1987). *The psychology of embarrassment.* Chichester, UK: Wiley.

Edelmann, R. J., & Hampson, S. E. (1981). Embarrassment in dyadic interaction. *Social Behavior and Personality, 9,* 171–177.

Eibl-Eibesfeldt, I. (1989). *Human ethology*. New York: Aldine de Gruyter Press.

Ekman, P. (1984). Expression and the nature of emotion. In K. Scherer & P. Ekman (Eds.), *Approaches to emotion* (pp. 319–343). Hillsdale, NJ: Erlbaum.

Fink, E. L., & Walker, B. A. (1977). Humorous responses to embarrassment. *Psychological Reports, 40,* 475–485.

Fridlund, A. J. (1991). Sociality of solitary smiling: Potentiation by an implicit audience. *Journal of Personality and Social Psychology, 60,* 229–240.

Friedman, H. S., & Miller-Herringer,.T. (1991). Nonverbal display of emotion in public and in private: Self-monitoring, personality, and expressive cues. *Journal of Personality and Social Psychology, 61,* 766–775.

Goffman, E. (1967). *Interaction ritual: Essays on face-to-face behavior.* Garden City, NY: Anchor.

Guerin, B. (1989). Social inhibition of behavior. *Journal of Social Psychology, 129,* 225–233.

Heckhausen, H. (1984). Emergent achievement behavior: Some early developments. In J. Nicholls (Ed.), *Advances in motivation and achievement. Vol. 3: The development of achievement motivation* (pp. 1–32). Greenwich, CT: JAI Press.

Hess, U., Banse, R., & Kappas, A. (1995). The intensity of facial expression is determined by underlying affective state and social situation. *Journal of Personality and Social Psychology, 69,* 280–288.

Jakobs, E., Manstead, A. S. R., & Fischer, A. H. (1999a). Social motives and emotional feelings as determinants of facial displays: The case of smiling. *Personality and Social Psychology Bulletin, 25,* 424–435.

Jakobs, E., Manstead, A. S. R., & Fischer, A. H. (1999b). Social motives, emotional feelings, and smiling. *Cognition and Emotion, 13,* 321–345.

Keltner, D. (1995). Signs of appeasement: Evidence for the distinct displays of embarrassment, amusement, and shame. *Journal of Personality and Social Psychology, 68,* 441–454.

Keltner, D., Buswell, B. N. (1997). Embarrassment: Its distinct form and appeasement function. *Psychological Bulletin, 122,* 250–270.

Kilbride, J. E., & Yarczower, M. (1980). Recognition and imitation of facial expressions: A cross-cultural comparison between Zambia and the United States. *Journal of Cross-Cultural Psychology, 11*, 281–296.

Kleck, R. E., Vaughan, R. C., Cartwright-Smith, J., Vaughan, K. B., Colby, C., & Lanzetta, J. (1976). Effects of being observed on expressive, subjective, and physiological reactions to painful stimuli. *Journal of Personality and Social Psychology, 34,* 1211–1218.

Kraut, R. E. (1982). Social presence, facial feedback, and emotion. *Journal of Personality and Social Psychology, 42,* 853–863.

Lewis, M. , Alessandri, S. M., & Sullivan, M. W. (1992). Differences in shame and pride as a function of children's gender and task difficulty. *Child Development, 63*, 630–638.

Lewis, M., Stanger, C., Sullivan, M. W., & Barone, P. (1991). Changes in embarrassment as a function of age, sex, and situation. *British Journal of Development Psychology, 9*, 485–492.

MacDonald, L. M., & Davies, M. F. (1983). Effects of being observed by a friend or stranger on felt embarrassment and attributions of embarrassment. *Journal of Psychology, 113*, 171–174.

Miller, R. S. (1996). *Embarrassment: Poise and peril in everyday life*. New York: Guilford Press.

Miller, R. S., & Leary, M. R. (1992). Social sources and interactive functions of embarrassment. In M. Clark (Ed.). *Emotion and social behavior* (pp. 202–221). New York: Sage.

Modigliani, A. (1968). Embarrassment and embarrassability. *Sociometry, 31,* 313–326.

Modigliani, A. (1971). Embarrassment, facework, and eye contact: Testing a theory of embarrassment. *Journal of Personality and Social Psychology, 17*, 15–24.

Murnen, S.K., & Stockon, M. (1997). Gender and self-reported sexual arousal in response to sexual stimuli: A meta-analytic review. *Sex Roles, 37,* 135–153.

Parrott, W. G., & Smith, S. F. (1991). Embarrassment: Actual vs. typical cases and classical vs. prototypical representations. *Cognition and Emotion, 5*, 467–488.

Quinsey, V.L., Ketsetzis, M., Earls, C., & Karamanoukian, A. (1996). Viewing time as a measure of sexual interest. *Ethology and Sociobiology, 17,* 341–354.

Riggio, R.E., & Friedman, H.S. (1983). Individual differences and cues to deception. *Journal of Personality and Social Psychology, 45*, 899–915.

Semin, G. R., & Manstead, A. S. R. (1982). The social implications of embarrassment displays and restitution behaviour. *European Journal of Social Psychology, 12*, 367–377.

Stipek, D., Recchia, S., & McClintic, S. (1992). Self-evaluation in young children. *Monographs of the Society for Research in Child Development, 57*, 1–84.

Streiner, D. L., & Lin, E. (1998). Life after chi-squared: An introduction to log-linear analysis. *Canadian Journal of Psychiatry, 43*, 837–842.

Tangney, J. P., Marschall, D., Rosenberg, K., Barlow, D. H., & Wagner, P. (1992). Are shame, guilt, and embarrassment distinct emotions? *Journal of Personality and Social Psychology, 70*, 1256–1264.

Wagner., H., & Lee, V. (1999). Facial behavior alone and in the presence of others. In P. Philippot, R.S. Feldman, & E.J. Coats (Eds.), *The social context of nonverbal behavior. Studies in emotion and social interaction.* (pp. 262–286). New York: Cambridge University Press.

Yarczower, M., & Daruns, L. (1982). Social inhibition of spontaneous facial expressions in children. *Journal of Personality and Social Psychology, 43*, 831–837.

Yarczower, M., Kilbride, J. E., & Hill, L. A. (1979). Imitation and inhibition of facial expression. *Developmental Psychology, 15*, 453–454.